US-PAT-NO: 6280790

DOCUMENT-IDENTIFIER: US 6280790 B1

TITLE: Reducing the deposition rate of volatile contaminants onto an optical component of a substrate processing system

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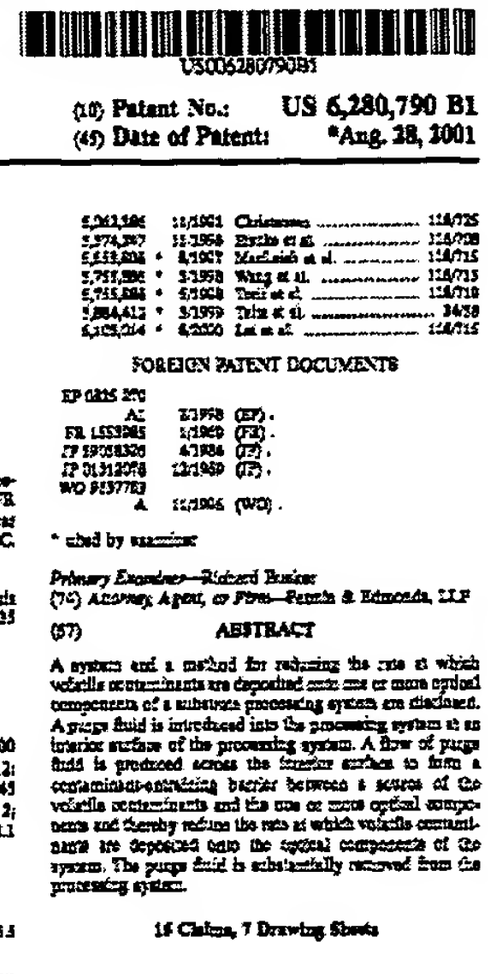
Brief Summary Text - BSTX (4):

Layers of doped glass, such as borophosphosilicate glass (BPSG) or phosphosilicate glass (PSG), are used extensively in pre-metal dielectric (PMD) layers in logic and memory devices. Doped glass layers are typically deposited onto a substrate in a CVD system and are subsequently heated to a high temperature in an RTP chamber or a furnace. In one heating process, doped glass is densified by heating the doped glass to a temperature of 700-800.degree. C. in an RTP chamber. Heating the doped glass in this way reduces the porosity of the layer, relieves stress in the film, drives off residual impurities left from CVD deposition,



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(12) **United States Patent**
White et al.

(10) Patent No.: US 6,280,790 B1
(45) Date of Patent: *Aug. 28, 2001

(54) **REDUCING THE DEPOSITION RATE OF VOLATILE CONTAMINANTS ONTO AN OPTICAL COMPONENT OF A SUBSTRATE PROCESSING SYSTEM**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 08/884,193

(22) Filed: Jun. 30, 1997

(51) Int. Cl.[7] C23C 16/00

(52) U.S. Cl. 427/9; 427/248.1; 118/712; 118/715; 156/345

(58) Field of Search 118/715, 712; 156/345; 427/8, 248.1

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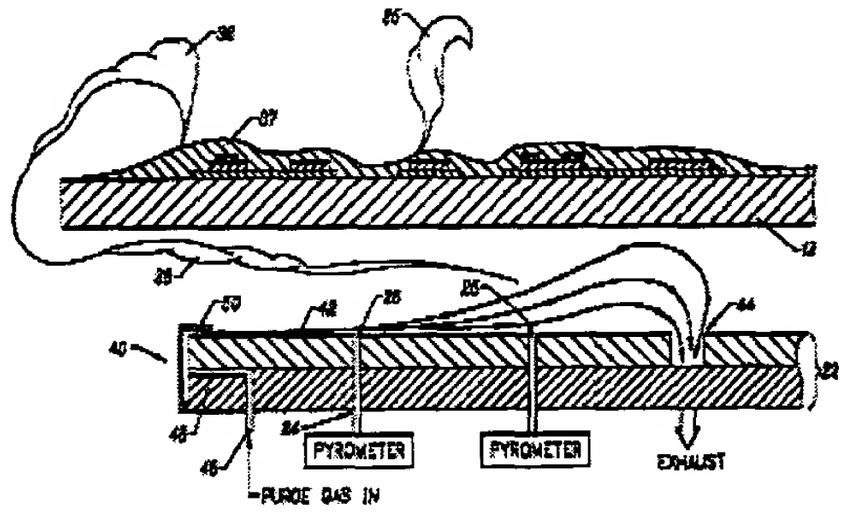
(57) **ABSTRACT**

A system and a method for reducing the rate at which volatile contaminants are deposited onto one or more optical components of a substrate processing system are disclosed. A purge fluid is introduced into the processing system at an interior surface of the processing system. A flow of purge fluid is produced across the interior surface to form a contaminant-containing barrier between a source of the volatile contaminants and the one or more optical components and thereby reduces the rate at which volatile contaminants are deposited onto the optical components of the system. The purge fluid is substantially removed from the processing system.

16 Claims, 7 Drawing Sheets



L Number	Hits	Search Text	DB	Time stamp
2	2	BPSG with reflow$3 with (ultraviolet or UV)	USPAT; US-PGPUB	2003/04/08 11:00
3	8	BPSG same reflow$3 same (ultraviolet or UV)	USPAT; US-PGPUB	2003/04/08 11:02
4	1	dielectric with reflow$3 with (ultraviolet or UV)	USPAT; US-PGPUB	2003/04/08 11:12
5	1	(insulating or insulator) with reflow$3 with (ultraviolet or UV)	USPAT; US-PGPUB	2003/04/08 11:04
6	1	("6297067").PN.	USPAT; US-PGPUB	2003/04/08 11:16
7	289	resist with BPSG	USPAT; US-PGPUB	2003/04/08 11:26
8	2058	Ohno.in.	USPAT; US-PGPUB	2003/04/08 11:27
9	63993	438/$.ccls.	USPAT; US-PGPUB	2003/04/08 11:27
10	49	Ohno.in. and 438/$.ccls.	USPAT; US-PGPUB	2003/04/08 11:28
11	2	(resist with BPSG) and (Ohno.in. and 438/$.ccls.)	USPAT; US-PGPUB	2003/04/08 11:43
12	9268	resist with materials	USPAT; US-PGPUB	2003/04/08 11:48
13	10413	resist with (dielectric or insulator or insulating)	USPAT; US-PGPUB	2003/04/08 11:49